

until after the dissipation of the hurricane it is not improbable that the conditions induced by the latter were favorable for the formation of the tornado.

The typhoon that was in progress when the tornado described by Professor Barbour occurred was, according to the Rev. José Coronas, of the Philippine Weather Bureau, one of eight to visit the Far East in the month of August, 1923. It is known as the *Meiacosima and China Typhoon* and has been described by Father Coronas as follows:

The first part of the track of this typhoon is somewhat uncertain, although it probably formed on August 3 to 4 south of Guam near 145° longitude E. and 10° latitude N., moving northwestward until August 6 and then westward on the 7th and part of the 8th. The center can easily be situated in our weather map of the 8th, 6 a. m., near 130° longitude E., between 18° and 19° latitude N.; and at 6 a. m. of the 9th in about 127° longitude E., between 20° and 21° latitude N. The typhoon was moving then NNW. and so it struck the Meiacosima group of islands about 150 miles east of northern Formosa on the 10th. The station of Ishigakihima reported at 6 a. m. of that day a barometer as low as 722.5 mm. with hurricane winds from the N. From Meiacosima the typhoon inclined northwestward and entered China in the morning of the 11th between 27° and 28° latitude N. Once in China it moved again NNW., gradually recurring to the NE. on the 12th, and traversed Manchuria on the 13th.—EDITOR.

THE EYE OF THE STORM¹

By DOUGLAS MANNING

[Alexandria Bay, N. Y.]

A rather interesting condition prevailed here yesterday morning, December 6, between 10 and 11:30 o'clock in the forenoon and, in my judgment, it was caused by the immediate passage of a vast low-pressure area centered

¹ Mr. Manning's observations show the prevalence of a central core of calm in an intense extra-tropical cyclone that passed over his station as described. Reference to the daily weather maps of the Weather Bureau show this cyclone to have had a small diameter and central pressure of 29.15 inches with a fully developed cyclonic circulation.—EDITOR.

551.573

NOTES, ABSTRACTS, AND REVIEWS

A METHOD OF COMPUTING EVAPORATION FROM TEMPERATURE GRADIENTS IN LAKES AND RESERVOIRS¹

By GEO. E. McEWEN

[Author's abstract]

A satisfactory interpretation of observations on the distribution of temperature, salinity, and other properties of water in the ocean, lakes, or reservoirs demands the mathematical formulation and solution of certain ideal problems. Although "field" observations must underlie the development of appropriate ideal problems, methods similar to those of mathematical physics can be used in dealing logically with such data. Also, as far as practicable, use should be made of well-established principles of physics, based upon laboratory experiments, but the main purpose of it all is to coordinate observations of natural phenomena.

This paper presents certain results of attempting to coordinate the amount of radiant energy absorbed by fresh water, the heat removed by evaporation; the water temperatures at a series of depths, and the time rate of change of temperature at each depth. It does not present any explanation of the mechanism or cause of evaporation. The qualitative physical basis of the

theory consists of the following fundamental assumptions:

At 7 o'clock in the morning when I stepped out of doors it was raining and the wind was blowing almost a whole gale out of the northeast, with the sky covered with dark masses of nimbuslike clouds moving out of the south-southwest and a low scud racing across it from the same direction as the wind or perhaps a point more from the east than the wind was. From then on the wind gradually diminished in force as a patch of blue sky that first appeared in the west approached and which appeared to occupy about a quarter of the sky, and from which the clouds seemed to melt and break away in all directions. As this clear area finally drifted overhead the wind died away completely making the surface of the St. Lawrence River, on the banks of which this village is situated, appear as a sheet of glass in sharp contrast to the white-capped waves kicked up by the northeast gale a short time before. At the same time the temperature which was standing around 36° F. rose to 44° F. and the sun came out making it feel like a day in Spring. Even the cirrus and heavy alto cumulus and stratus melted away in this area but all around us and especially to the west the sky was an angry black. I was sorry that I could not have observed my barometer at this time which read very low at 7 o'clock. This clear space soon passed over us followed by the wind suddenly coming out of the south and a heavy shower accompanied by a still further rise in temperature until the thermometer stood at 50°. After this the wind gradually got around to the southwest and began to blow around 30 to 35 miles per hour and with a drizzling rain and slowly falling temperature, with a tendency to blow in increasingly strong gusts. The cloud formation was that uniform grey seen at such times which is hard to classify otherwise than *strato cumulus* and *nimbus* which were moving from the southwest. This calm lasted about half an hour and to me was quite interesting.

theory consists of the following fundamental assumptions:

1. Heat is supplied to the water at each level by the absorption of radiant energy according to the familiar exponential law. The rate at which heat energy is absorbed depends upon the amount penetrating the water surface, the distance below the surface, and the absorption coefficient.

2. At the surface thin volume elements are cooled by evaporation at a rate assumed to be uniform throughout the whole surface area under which the temperatures may be considered equal to those at the station where observations are made. But the actual reduction of temperature of any one element varies—that is, different elements are cooled for different lengths of time, and consequently have different temperatures and specific gravities before beginning their descent. Therefore, the greater the reduction of temperature, or the colder and heavier the elements are, the longer will be the time required to produce the change, and the less frequent will be their descent. Also the number of elements in a given area, having a given temperature reduction will be smaller the greater the amount of the reduction.

3. Each element descends to a depth at which the average (observed) specific gravity is slightly less than that of the descending particle—that is, equilibrium is approached but not completely attained. Consequently

¹ Original paper presented at meeting of American Meteorological Society at Los Angeles, Calif., Sept. 17-19, 1923.